What is claimed is:

1. A method of increasing a data storage capacity of a data storage device having a media surface, the method comprising the steps of:

(a) selecting a linear density of data and recording data in the selected linear density on a portion of the media surface;

(b) reading the recorded data and measuring a metric indicative of error rate of the recorded data; and

(c) comparing the measured metric to a reference metric indicative of acceptable error rate, and if the measured metric is greater than the reference metric, repeating steps (a) to (c) for the selected linear density less a decrement, until the measured metric is less than or equal to the reference metric, to determine a recordable linear density of data for the portion of the media surface.

2. The method of claim 1 wherein in the first iteration of step (a), the selected linear density is selected to be an estimated maxima of linear density of data for the portion of the media surface.

3. The method of claim 1 further comprising the steps of repeating steps (a) to (c) for each portion of the media surface.

4. The method of claim 1 further comprising the steps of repeating steps (a) to (c) for a plurality of media surfaces in the data storage device.

5. The method of claim 4 further comprising the steps of calculating

a surface capacity of data for each media surface from the recordable linear density of data for that media surface.

6. The method of claim 5 further comprising the steps of summing the surface capacities of the media surfaces to determine a device capacity, and qualifying the data storage device if the device capacity is higher than a target capacity.

7. The method of claim 1 further comprising the steps of:

(1) selecting a track density of data and recording data in the selected track density on the portion of the media surface;

(2) reading the recorded data and measuring an error rate of the data; and

(3) comparing the measured error rate to an acceptable error rate, and if the measured error rate is greater than the acceptable error rate, repeating steps (1) to (3) for the selected track density less a decrement, until the measured error rate is less than or equal to the acceptable error rate, to determine a recordable track density of data for the portion of the media surface.

8. The method of claim 1 further comprising the steps of:

(1) selecting an error code level of data and recording data at the selected error code level on the portion of the media surface;

(2) reading the recorded data and measuring an error rate of the recorded data; and

(3) comparing the measured error rate to an acceptable

error rate, and if the measured error rate is greater than the acceptable error rate, repeating steps (1) to (3) for the selected error code level plus an increment in error code level, until the measured error rate is less than or equal to the acceptable error rate, to determine a recordable error code level for the portion of the media surface.

9. The method of claim 1 wherein step (a) comprises the step of selecting a linear density of data for a media surface comprising a disk surface of a disk drive.

10. A data storage device prepared for storage of data by the method of claim 1.

11. A method of increasing a data storage capacity of a data storage device having a media surface, the method comprising the steps of:

(a) selecting a track density of data and recording data in the selected track density on a portion of the media surface;

(b) reading the recorded data and deriving a quality metric indicative of an error rate of the recorded data; and

(c) comparing the quality metric to a reference metric indicative of an acceptable error rate, and if the quality metric indicates an error rate greater than an acceptable error rate indicated by the reference metric, repeating steps (a) to (c) for the track density less a decrement, until the quality metric indicates an error rate less than or equal to the acceptable error rate, to determine a recordable track density of data for the portion of the media surface.

12. The method of claim 11 wherein in the first iteration of step (a), the selected track density is selected to be an estimated maxima of track density for the media surface.

13. The method of claim 11 further comprising the steps of repeating steps (a) to (c) for each portion in the media surface.

14. The method of claim 11 further comprising the steps of repeating steps (a) to (c) for a plurality of media surfaces in the data storage device.

15. The method of claim 14 further comprising the steps of calculating a surface capacity of each media surface from the recordable track density of each media surface.

16. The method of claim 11 further comprising the steps of summing the calculated surface capacities of each media surface to derive a device capacity, and qualifying the data storage device if the device capacity is higher than a target capacity.

17. The method of claim 11 further comprising the steps of:

(1) selecting a linear density of data and recording data in the selected linear density on the portion of the media surface;

(2) reading the recorded data and deriving the quality metric; and

(3) comparing the quality metric to the reference metric indicative of an acceptable error rate, and if the quality metric indicates an error rate greater than an indicated acceptable error rate, repeating steps (1) to (3) for the selected linear density less a decrement, until the quality metric indicates an error rate less than or equal to the indicated acceptable error rate, to determine a recordable linear density of data for the portion of the media surface.

18. The method of claim 11 further comprising the steps of:

(1) selecting an error code level of data and recording data in the selected error code level on a portion of the media surface;

(2) reading the recorded data and developing a quality metric indicative of an error rate of the recorded data; and

(3) comparing the quality metric indicated error rate to an acceptable reference metric, and if the quality metric indicates an error rate greater than the acceptable reference metric, repeating steps (1) to (3) for the selected error code level plus an increment in error code level, until the quality metric indicates an error rate less than or equal to the acceptable reference metric, to determine a recordable error code level for the portion of the media surface.

19. The method of claim 11 wherein step (a) comprises the step of selecting a track density of data comprising a number of tracks per unit radial length for a media surface comprising a disk surface of a disk drive.

20. The method of claim 11 wherein the media surface has a series of

radially extending servo wedges written at a fixed servo track density and having servo bursts and further being interleaved between sectors of data tracks, and wherein at least some of the data tracks written at a selected data track density are written at servo burst non-null radial positions.

21. A data storage device prepared for storage of data by the method of claim 11.

22. A method of increasing a data storage capacity of a data storage device having a media surface, the method comprising the steps of:

(a) selecting an error code level of data and recording data in the error code level on a portion of the media surface;

(b) reading the recorded data and measuring an error rate of the recorded data; and

(c) comparing the measured error rate to an acceptable error rate, and if the measured error rate is greater than the acceptable error rate, repeating steps (a) to (c) for the error code level plus an increment in error code level, until the measured error rate is less than or equal to the acceptable error rate, to determine a recordable error code level of data for the portion of the media surface.

23. The method of claim 22 wherein in the first iteration of step (a), the selected error code level is selected to be an estimated minima of an error code level of data.

24. The method of claim 22 further comprising the steps of repeating

steps (a) to (c) for each portion in the media surface.

25. The method of claim 22 further comprising the steps of repeating steps (a) to (c) for a plurality of media surfaces in the data storage device.

26. The method of claim 25 further comprising the steps of calculating a surface capacity of each media surface from the recordable error code level for each media surface.

27. The method of claim 26 further comprising the steps of summing the calculated surface capacities of each media surface to derive a device capacity, and qualifying the data storage device if the device capacity is higher than a target capacity.

28. The method of claim 22 further comprising the steps of:

(1) selecting a linear density of data and recording data in the linear density on the portion of the media surface;

(2) reading the recorded data and measuring an error rate of the data; and

(3) comparing the measured error rate to an acceptable error rate, and if the measured error rate is greater than the acceptable error rate, repeating steps (1) to (3) for the selected error rate less a decrement, until the measured error rate is less than or equal to the acceptable error rate, to determine a recordable linear density of data for the portion of the media surface.

29. The method of claim 22 further comprising the steps of:

(1) selecting a track density of data and recording data in the selected track density on the portion of the media surface;

(2) reading the recorded data and measuring an error rate of the recorded data; and

(3) comparing the measured error rate to the acceptable error rate, and if the measured error rate is greater than the acceptable error rate, repeating steps (1) to (3) for the track density less a decrement, until the measured error rate is less than or equal to the acceptable error rate, to determine a recordable track density of data for the portion of the media surface.

30. The method of claim 22 wherein step (a) comprises the step of selecting a minimum error code level for a media surface comprising a disk surface of a disk drive.

31. A data storage device prepared for storage of data by the method of claim 22.

32. A method of increasing a data storage capacity of a data storage device having a media surface, the method comprising the steps of:

(a) selecting for a portion of the media surface, one or more of a linear density of data, a track density of data, or an error code level of data;

(b) recording data on the portion of the media surface at the selected linear density, track density, or error code level;

(c) reading the recorded data and developing an error metric indicative of an error rate of the recorded data; and

(d) comparing the error metric indicated error rate to a reference metric indicative of an acceptable error rate, and if the indicated error rate is greater than the acceptable error rate, repeating steps (b) to (d) for another linear density, track density, or error code level, until the indicated error rate is less than or equal to the acceptable error rate, to determine a recordable linear density, track density, or error code level of data for the portion of the media surface.

33. The method of claim 32 wherein in step (a), the selected linear density and track density are estimated maxima levels for the media surface, and the selected error code level is an estimated minima level for the media surface.

34. The method of claim 32 further comprising the steps of repeating steps (a) to (c) for each portion in the media surface.

35. The method of claim 32 further comprising the steps of repeating steps (a) to (c) for a plurality of media surfaces in the data storage device.

36. The method of claim 32 further comprising the steps of calculating a surface capacity of each media surface from the recordable linear density, track density, or error code level for the media surface.

37. The method of claim 36 further comprising the steps of summing the calculated surface capacities of each media surface to derive a device capacity, and qualifying the data storage device if the device capacity is higher than a target capacity.

38. The method of claim 32 wherein step (a) comprises the step of selecting a track density of data, linear density of data, or error code level of data, for a media surface comprising a disk surface of a disk drive.

39. A data storage device prepared for storage of data by the method of claim 32.

40. A method of testing a data storage device having a plurality of media surfaces, the method comprising the steps of:

(a) measuring for each media surface, at least one of a maximum recordable track density of data, maximum recordable linear density of data, or minimum recordable error code level of data;

(b) calculating the surface capacity of each media surface from the measured maximum recordable track density, maximum recordable linear density, or minimum recordable error code level; and

(c) summing the surface capacities of each media surface to determine a device capacity and qualifying the data storage device if the device capacity equals or exceeds a target capacity.

41. The method of claim 40 wherein step (a) comprises the steps of:

(1) selecting a track density of data and recording data in the selected track density on the media surface;

(2) reading the recorded data and measuring an error rate of the recorded data; and

(3) comparing the measured error rate to an acceptable error rate, and if the measured error rate is greater than the acceptable error rate, repeating steps (1) to (3) for the selected track density less a decrement, until the error rate is less than or equal to the acceptable error rate, to determine a maximum recordable data track density for the media surface.

42. The method of claim 41 wherein the media surface has a series of radially extending servo wedges written at a fixed servo track density and having servo bursts and further being interleaved between sectors of data tracks, and wherein at least some of the data tracks written at maximum recordable data track density are written at servo burst non-null radial positions.

43. The method of claim 40 wherein step (a) comprises the steps of:

(1) selecting a linear density of data and recording data in the linear density on the media surface;

(2) reading the recorded data and measuring an error rate of the recorded data; and

(3) comparing the measured error rate to an acceptable error rate, and if the measured error rate is greater than the acceptable error

rate, repeating steps (1) to (3) for the linear density less a decrement, until the measured error rate is less than or equal to the acceptable error rate, to determine a maximum recordable linear density of data for the media surface.

44. The method of claim 40 wherein step (a) comprises the steps of:

(1) selecting an error code level of data and recording data in the error code level on the media surface;

(2) reading the recorded data and measuring an error rate of the recorded data; and

(3) comparing the measured error rate to an acceptable error rate, and if the measured error rate is greater than the acceptable error rate, repeating steps (1) to (3) for the error code level plus an increment in error code level, until the measured error rate is less than or equal to the acceptable error rate, to determine a minimum recordable error code level of data for the media surface.

45. The method of claim 40 wherein step (a) comprises the step of measuring for each media surface, a maximum recordable linear density and track density of data, and further comprising the step of assigning to each media surface an error code level in relation to the measured maximum recordable linear density and track density.

46. A data storage device prepared for storage of data by the method of claim 40.

47. A data storage device comprising a head, a media surface, and a controller capable of providing signals to the head for reading and writing data on a portion of the media surface, at a predetermined track density, linear density, or error code level of data, one or more of which are measured.

48. The data storage device of claim 47 wherein the controller is programmed to write data on each portion of the media surface at a plurality of track density, linear density, or error code levels of data.

49. The data storage device of claim 47 further comprising a plurality of magnetic heads and media surfaces, and wherein the controller is programmed to write data on each portion of a media surface at a plurality of track density, linear density, or error code levels of data.

50. The data storage device of claim 47 wherein the controller is programmed to write data on each portion of the media surface at a maximum recordable track density, maximum recordable linear density of data, or a minimum recordable error code level of data, each of which is measured for a paired head and media surface.

51. The data storage device of claim 47 wherein the head comprises a magnetic head and the media surface comprises a magnetic surface, and wherein a magnetic head abuts a magnetic surface.

52. The data storage device of claim 47 wherein the head comprises a magnetic head and the media comprises a magnetic disk surface, and wherein the magnetic head is proximal to the magnetic surface upon an air bearing.

53. The data storage device of claim 52 wherein the magnetic disk surface defines a series of radially extending servo wedges recorded at a fixed servo track density and having servo bursts and further being interleaved between sectors of data tracks, and a head position digital controller, and wherein at least some of the data tracks are written under supervision of the controller at servo burst non-null radial positions of the magnetic disk surface.

54. A data storage device comprising a plurality of pairs of media surfaces and heads, and a controller that controls the heads for reading and writing data on the media surfaces, the controller being programmed to write data at a measured track density, linear density, or error code level of data, one or more of which are measured by the steps of:

(a) selecting for a portion of a media surface, a linear density, track density, or error code level of data;

(b) recording data on the portion of the media surface at the selected linear density, track density, or error code level;

(c) reading the recorded data and developing a quality metric indicative of an error rate of the recorded data; and

(d) comparing the quality metric to a reference metric indicative of an acceptable error rate, and if the indicated error rate is

greater than the acceptable error rate, repeating steps (b) to (d) for another linear density, track density, or error code level, until the quality metric indicates an error rate less than or equal to the indicated acceptable error rate, to determine a measured linear density, track density, or error code level of data for the portion of the media surface.

55. The data storage device of claim 54 wherein the controller is programmed to write data on each portion of the media surface at a plurality of recordable track density, linear density, or error code levels of data.

56. The data storage device of claim 54 further comprising a plurality of heads and media surfaces, and wherein the controller is programmed to write data on each portion of the media surfaces at a plurality of recordable track density, linear density, or error code levels of data.

57. The data storage device of claim 54 wherein the controller is programmed to write data on each portion of the media surface at a maximum recordable track density, maximum recordable linear density of data, or a minimum recordable error code level of data, each of which is measured for a paired head and media surface.

58. The data storage device of claim 54 wherein the head comprises a magnetic head and the media surface comprises a magnetic surface, and wherein a magnetic head abuts a magnetic surface.